

SBUV Merged Ozone Data Set, Revision 3, README File

The **SBUV Merged Ozone Data Set (SBUV MOD)** is a monthly 5° zonal-mean time series of total column and profile ozone spanning the period from 1970 – July 2013, constructed from measurements made by the Nimbus-4 BUUV, Nimbus-7 SBUV, and a series of SBUV(/2) instruments (Figure 1). The SBUV MOD is a consistent, well-calibrated dataset of ozone profiles that can be used for climate studies and trend analyses. We construct the SBUV MOD using a simple average of SBUV data. We select the periods of data to include in SBUV MOD based on internal validation results, and do not apply any additional offsets to the original data records.

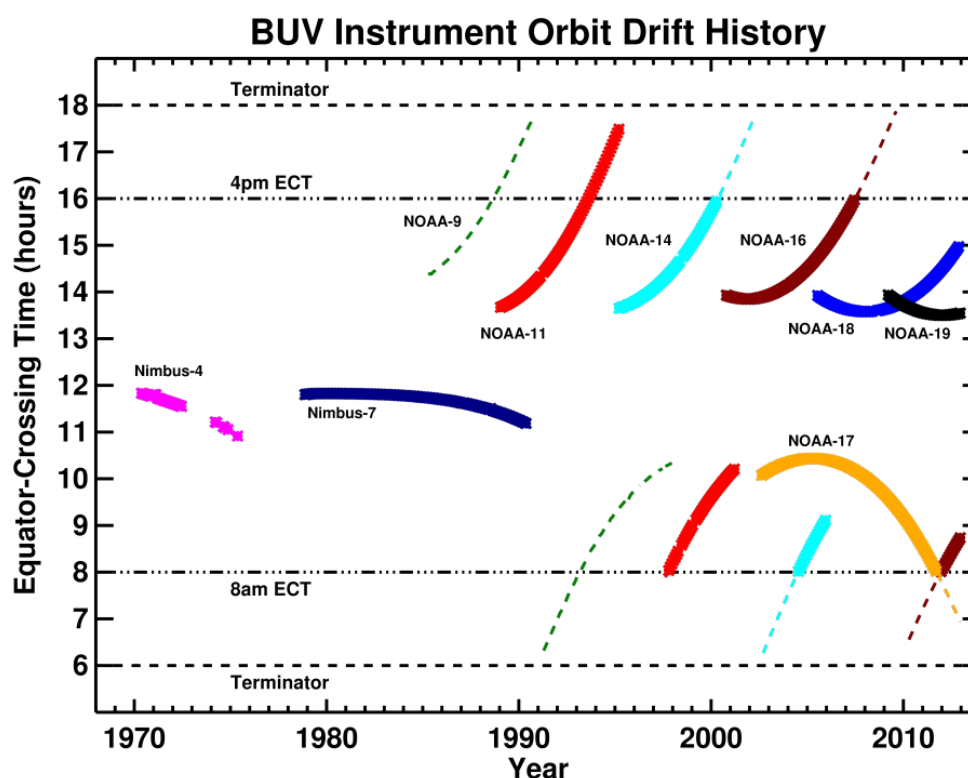


Figure 1. Equator Crossing Times of the SBUV instrument series as a function of time. The SBUV data set includes measurements obtained from the Nimbus-4 BUUV instrument, the Nimbus-7 SBUV instrument, and the series of SBUV/2 instruments on board NOAA satellites 9, 11, 14, 16, 17, 18 and 19. The orbital properties of each satellite vary. In general, measurements taken within the 8am to 4pm ECT range are less noisy. Solid lines indicate time periods for each instrument that were included in the SBUV MOD.

Recently data from all SBUV instruments were reprocessed using the updated Version 8.6 algorithm [1, 2, 3]. SBUV ozone profiles obtained from each instrument have been extensively validated against independent satellite and ground-based profile measurements [4, 5]. Drifts in the SBUV time series and their potential effect on the long-term stability of the combined data record were evaluated, and these results were used to select data for the SBUV MOD [6, 7].

Data from the SBUV instruments that collectively cover the 1980s and 2000s are very stable, with drifts mostly less than 0.5% per year [5]. Measurements in the 1990s, obtained from NOAAs 9, 11 and 14, have larger uncertainties. The NOAA11 time series between 1989 and early 1995 is stable (drift less than $\pm 0.5\%/yr$), making this data preferable to NOAA 09 data when extending the Nimbus 7 record into the 1990s. In 1995, as NOAA 11 enters the terminator, the NOAA 14 data become available. Though NOAA 14 drifts significantly, the vertical structure of this drift is well-characterized and can be accounted for in the merged data set uncertainties [7]. Limited validation of Nimbus 4 ozone profiles do not allow us to draw specific conclusions, but results suggest that Nimbus 4 data can reasonably be used to extend the SBUV data set back to the 1970s.

SBUV instruments measure the profile in the upper stratosphere with a resolution that is adequate to resolve most variability in that region. In the lower stratosphere the limited vertical resolution of the SBUV system means that there are components of the profile variability that SBUV cannot measure [8]. To reflect the true resolution of the SBUV in the lower stratosphere the lowest defined layer in the SBUV MOD is from the surface to 25 hPa (16 hPa) outside (inside) of the narrow equatorial zone 20S-20N.

When creating the SBUV MOD version 8.6 we use the following criteria:

- NOAA-9 SBUV/2 data are not included due to multiple instrumental issues [2, 4];
- Only measurements made when the instrument Equator Crossing Time is between 8am to 4pm (see Fig. 1) are included, with one exception in 1994-1995, when NOAA 11 data are included to avoid a gap in the data;
- Profile MOD data are filtered for aerosol contamination after the eruptions of El Chichon and Mt. Pinatubo [4, 7].

Table 1. Vertical scale for the SBUV MOD.

	Surface -25 hPa	Surface -16 hPa	25-16 hPa	16-10 hPa	10-6 hPa	6-4 hPa	2-4 hPa	2-1.6 hPa	1.6 -1 hPa	Above 1 hPa
50S-20S										
20S-20N										
20N-50N										

Reference:

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